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Dr. R.C. Williams,
The Virus Laboratory,
University of California,
BERKELEY 4,
California, U.S.A.

14th February, 1955.

Dear Dr. Williams,

Thank you very much for your letter of 6th January.

Of the two difficulties which you mention, I find the hexagonal platelets rather more disturbing than the density considerations. I don't think the X-ray results are consistent with a helical rod of hexagonal cross-section. I suppose it is possible that the stable configuration of a very short length of the rods is different, and that some re-arrangement may therefore occur when it is broken off. Alternatively, if the virus is of a well-defined length, the ends presumably differ in some way from the rest of it so could the hexagons be the end-pieces? I don't think either of these explanations is very satisfactory.

The calculated density depends on the accurate knowledge of the diameter. Bernal and Fankuchen's figure was 152A, not 150A, and this reduces the density from 1.52 to 1.48 s/cc. Pirie has always emphasised, in discussion, that his preparations have been inundated in commercial trypsin and therefore differ from most other preparations and, in particular, may have lost something from the surface. The diameter need only be increased to 157A to reduce the density to 1.38s/cc.

Again, if I am right in thinking that a helical groove is an important feature of the structure, then for an inter-particle distance of say, 152A, the volume of the particle may be slightly greater than that of a cylinder of diameter 152A, owing to interlocking of the grooves of neighbouring particles. But this effect is unlikely to be greater than about 2%.

So although the observed and calculated densities cannot be said to agree, I think the diameter and shape of the particle are probably sufficiently uncertain for this not to be too serious.

My measurements suggest that the groove may have a depth of as much as 20A (with pitch 23A). Would you expect to be able to detect such a groove in the electron microscope? I don't

P.T.O.

know anything precise about its contour, except that it seems to be such as to allow inter-looking of neighbouring particles.

With best wishes,
Yours sincerely,

Rosalind Franklin.